

In the Claims:

Please amend the claims as follows.

Please cancel claims 327 and 356 without prejudice.

The following lists all claims and their status:

Claims 1-308 (cancelled)

309. (Currently amended): A method for forming a sensor array configured to detect an analyte in a fluid, comprising:

forming a cavity a plurality of cavities in a supporting member, wherein at least one cavity of the plurality of cavities is configured such that fluid entering the at least one cavity passes through the supporting member;

applying a magnetic field to the cavity one or more cavities;

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passing a plurality of magnetic particles over the cavity cavities, wherein the plurality of cavities are configured to substantially inhibit movement of one or more magnetic particles within the support member; and wherein the one or more magnetic particles is are configured to produce a signal when the magnetic particles interacts with the analyte, and wherein the magnetic particles is are configured to interact with the magnetic field such that movement of the magnetic particles is inhibited by the applied magnetic field.

310. (Currently amended): The method of claim 309, wherein forming the plurality of cavities comprises anisotropically etching a silicon wafer.
311. (Currently amended): The method of claim 309, wherein forming the cavity plurality of cavities comprises anisotropically etching a silicon wafer such that sidewalls of the cavity are tapered at an angle from about 50 degrees to about 60 degrees.
312. (Currently amended): The method of claim 309, wherein the applying a magnetic field to the one or more cavities comprises placing a permanent magnet in proximity to the cavity one or more cavities.
313. (Currently amended): The method of claim 309, wherein the applying a magnetic field to the cavity one or more cavities comprises:
placing an electromagnet in proximity to the cavity one or more cavities; and
applying an electric current to the electromagnet.
314. (Currently amended): The method of claim 309, wherein the plurality of magnetic particles comprises a magnetic material.
315. (Currently amended): The method of claim 309, wherein the plurality of magnetic particles comprises a polymeric material and a magnetic material.
316. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and an alnico magnetic material.

317. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a ferrite magnetic material.
318. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a barium ferrite magnetic material.
319. (Currently amended): The method of claim 309, wherein at least one particle of the one or more magnetic particles comprises a polymeric material and a strontium ferrite magnetic material.
320. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a neodymium iron boron magnetic material.
321. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a samarium cobalt magnetic material.
322. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a ferromagnetic material.
323. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and iron oxide.

324. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material, a metallocene and a metal hydroxide.
325. (Currently amended): The method of claim 309, wherein at least one particle of the plurality of magnetic particles comprises a polymeric material and a magnetic material, and wherein the ~~method further comprises~~ at least one magnetic particle is produced by a method comprising:
- placing the polymeric material and magnetic material in a solvent; and
- applying ultrasound to the polymeric material and the magnetic material in the solvent.
326. (Currently amended): The method of claim 309, ~~further comprising forming a plurality of cavities in a supporting member; wherein passing a plurality of magnetic particles over the cavities comprises:~~
- applying a magnetic field to at least a first portion of the plurality of cavities; and
- passing a plurality of particles over the cavities, and wherein at least one particle of the plurality of magnetic particles is configured to interact with the magnetic field such that movement of the at least one magnetic particle is inhibited by the applied magnetic field, and wherein the plurality of magnetic particles are substantially retained within the first portion of the cavities by the applied magnetic field.

Inventors: McDevitt et al.
Appl. No.: 09/775,342
Atty Dkt. No.: 5119-00523

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Claim 327-377 (cancelled)

Response to Office Action Mailed February 14, 2003

A. Claims In The Case

Claims 309-327 and 356 are pending. Claims 309-326 have been rejected. Claims 309-326 have been amended. Claims 327 and 356 have been cancelled without prejudice.

B. The Claims Are Enabled Pursuant to 35 U.S.C. § 112, first paragraph

The Examiner rejected claims 309-326 under 35 U.S.C. § 112, first paragraph as not enabled in the specification. Claim 309 has been amended for clarification. Applicant respectfully requests removal of the rejections of claims 309-326. *dc.*

C. The Claims Are Not Indefinite Pursuant to 35 U.S.C. § 112, second paragraph

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The Examiner rejected claims 309-326 under U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully disagrees that the claims are indefinite. Claims 309, 325, and 326 have been amended for clarification. Applicant submits that the claims are now definite.

D. The Claims Are Not Obvious Over Hatch In View of Wang Pursuant to 35 U.S.C. § 103(a)

Claims 309, 312-314, and 326 were rejected as being obvious over U.S. Patent No. 6,514,415 to Hatch et al. (hereinafter referred to as "Hatch") in view of U.S. Patent No.

5,922,617 to Wang et al. (hereinafter referred to as "Wang"). Applicant respectfully disagrees that the claims are obvious over Hatch in view of Wang.

To reject a claim as obvious, the Examiner has the burden of establishing a *prima facie* case of obviousness. *In re Warner et al.*, 379 F.2d 1011, 154 U.S.P.Q. 173, 177-178 (C.C.P.A. 1967). To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974); MPEP 2143.03.

The Examiner states:

Hatch teaches a method and apparatus for magnetic separation of particles within a container. The container can be a 96-well micro plates (supporting member), 1536 well micro-plates; tubes, petri dishes. (see col. 3, lines 37-42). The container contains a number of particles and a number of magnetically susceptible particles...However, Hatch fails to teach that particles (magnetic particles) are configured to produce a signal when the particles interact with the analyte/target particle. Wang teaches different methods of immunoassay using a particle such as magnetic particles.
(Office Action, page 5-6)

Amended claim 309 describes a combination of features including, but not limited to the feature of "wherein the cavity is configured such that the fluid entering the cavity passes through the supporting member." Support for the amendments to claim 309 can be found at least in the Applicant's Specification, which states in part:

The supporting member may be configured to substantially inhibit the displacement of the particles from the cavities during use. The supporting member may also be configured to allow the passage of the fluid through cavities, e.g., the fluid may flow from the top surface of the supporting member, past the particle, and out the bottom surface of the supporting member. This may increase the contact time between the particle and the fluid.

(Applicant's Specification, page 52, lines 2-6); and

wherein the cavity is configured such that the fluid entering the cavity passes through the supporting member during use.

(Applicant's Specification, originally filed claim 42)

Hatch teaches:

Although the wells illustrated are round, other geometric shapes are contemplated, for example, square wells may be utilized.

(Hatch, column 3, lines 35-37); and

Three wells 610-612 are represented as cross-sectional views illustrating the consistent separation across the microplate 100. FIG. 6b illustrates the cross-sectional view of well 610 located towards the center of the microplate.

(Hatch, column 5, lines 46-49)

Hatch does not appear to teach or suggest cavities configured such that fluid entering the cavities passes through the supporting member. As shown in FIG. 4 and FIGS. 6b-6c, Hatch appears to teach wells where fluid does not pass through a supporting member. Hatch does not appear to teach or suggest at least the quoted features of claim 309.

depends what '6 where the support member is

Wang teaches "beads may then be bound at specific sites to the solid substrate and held at the site by magnetic forces." (Wang, column 6, lines 5-7) Wang also teaches, "[b]y having grooves in the solid substrate, once the bead has settled into the groove, it will be retained there by physical forces." (Wang, column 6, lines 13-16) Wang does not appear to teach or suggest cavities configured such that fluid passes through the supporting member. Wang appears to teach beads bound to specific sites and grooves to retain beads. Applicant submits the cited art does not appear to teach or suggest at least the quoted features of claim 309. Applicant respectfully requests removal of the rejection to independent claim 309 and the claims dependent thereon.

E. The Claims Are Not Obvious Over Taylor In View of Wang Pursuant To 35 U.S.C. § 103(a)

Claims 309, 312-314, and 326 were rejected as being unpatentable over U.S. Patent No. 6,103,479 to Taylor et al. (hereinafter referred to as "Taylor") in view of Wang. Applicant respectfully disagrees that the claims are obvious over Taylor in view of Wang.

The Examiner states:

Taylor teaches a device with non-uniform micro-patterned array of cells and method for making the device (col. 6, lines 40-50). In one embodiment of the chamber (ref. # 12) (support member) has channels and matching etched domains (ref. #13) (cavity). The non-uniform micro-patterned array of cells is inverted so that the wells become submerged in the etched domains filled with fluid (col. 14, lines 45-54, figs. 4 and 7)...It would have been obvious to one of ordinary skills in the art at the time the invention was made to modify the array of Taylor by placing the particles taught by Wang into the wells of the array because Wang teaches that particles such as magnetic beads offer the advantages of providing a great flexibility.

(Office Action, pages 7-8)

Claim 309 describes a combination of features including but not limited to the feature of "wherein the cavity is configured such that the fluid entering the cavity passes through the supporting member." Applicant submits that the cited art does not appear to teach or suggest at least the quoted features of claim 309.

Taylor teaches:

an array of microfluidic channels 14 matching the chamber's etched domains 13 which are slightly larger in diameter than the wells 8 of the non-uniform micro-patterned array of cells 10, so that the wells 4 are immersed into the etched domains 13 of the chamber 12...The non-uniform micro-patterned array of cells 10 and the chamber 12 can be sealed together using an elastomer or other sticky coating on the raised region of the chamber.
(Taylor, column 14, lines 27-37)

Taylor does not appear to teach or suggest a cavity configured such that fluid entering the cavity passes through the supporting member. Taylor appears to teach sealing a microarray to a chamber to deliver fluid to wells located on the microarray. Applicant submits Taylor does not appear to teach or suggest at least the quoted feature of claim 309. For at least the reasons previously mentioned, Wang does not appear to teach or suggest at least the quoted feature of claim 309. Applicant respectfully requests removal of the rejections to independent claim 309 and the claims dependent thereon.

F. The Claims Are Not Obvious Over Taylor In View Of Wang And In Further View Of Kroy Pursuant To 35 U.S.C. § 103(a)

Claims 310-311 were rejected as being unpatentable over Taylor in view Wang and in further view of U.S. Patent No. 5,252,294 to Kroy. (hereinafter referred to as “Kroy”). Applicant respectfully disagrees that the claims are obvious over Taylor in view of Wang and in further view of Kroy.

For at least the reasons previously mentioned, Applicant submits the cited art does not appear to teach or suggest the combination of features in claims 310-311. Applicant respectfully requests removal of the rejection to the claims.

G. The Claims Are Not Obvious Over Taylor In View Of Wang And In Further View Of Owen Pursuant To 35 U.S.C. § 103(a)

Claims 315, 317, and 322-323 were rejected as being unpatentable over Taylor in view Wang and in further view of U.S. Patent No. 5,866,099 to Owen. (hereinafter referred to as “Owen”). Applicant respectfully disagrees that the claims are obvious over Taylor in view of Wang and in further view of Owen.